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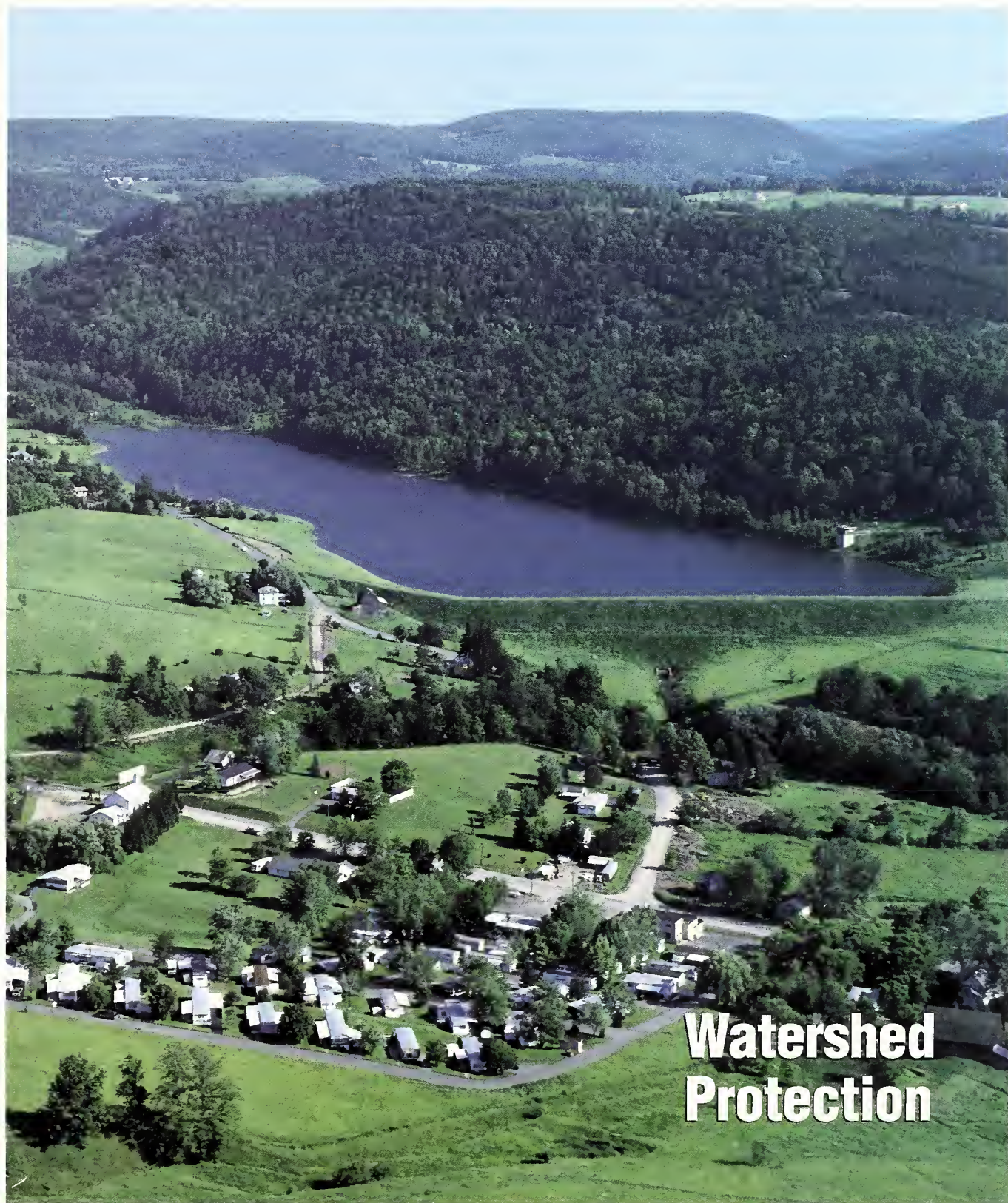
and **Soil Water Conservation** NEWS

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**Watershed
Protection**

Cover: The Marsh Creek Watershed in north-central Pennsylvania has been the site of Soil Conservation Service work under the PL 566 program. The watershed supplies water to the town of Wellsboro, which is situated below the pictured Hamilton Lake and its dam. The lake is also stocked with trout for fishing. (Tim McCabe photo)

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Edward Madigan
Secretary of Agriculture

James Moseley
Assistant Secretary
Natural Resources and Environment

William J. Richards
Chief
Soil Conservation Service

Henry Wyman
Director
SCS Public Information Division

Leslie Jane Wilder
Editor

Paul DuMont
Mary Jo Stine
Associate Editors

Kim Berry-Brown
Ted Kupelian
Contributing Editors

Chris Lozos
Design Consultant

Magazine inquiries
Send inquiries to: The Editor, *Soil and Water Conservation News*, Public Information Division, Soil Conservation Service, U.S. Department of Agriculture, P.O. Box 2890, Washington, DC 20013-2890.

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Comments from the SCS Chief:

The Need for Watershed Planning

I have experienced first hand the need for watershed protection and flood control. On our family farm in Ohio, my sons and I put in structures to divert stream currents and control the erosion inherent in bottomland farming.

And I'm familiar with the advantages of the total watershed planning approach. It makes sense to base decisions on the geography of the land, not just property boundary or political subdivision. Changes in a watershed because of population increase and the ensuing concrete and black-top can have an enormous effect on erosion and flood control. It's essential to have good local cooperation between landowners, agencies, and municipalities.

These are some of the reasons why I believe strongly that watershed development should be handled with a total cooperative watershed approach, as is happening with the PL 566 program. The Small Watershed Protection and Flood Prevention Program (Public Law 83-566) was passed by Congress in 1954. Amendments have updated it, focusing, for example, on water quality as it became a national priority.

The program combines larger, community-type water resource structures with complete conservation systems on farms in the project area. It has enabled the Soil Conservation Service to help watershed districts and local sponsors plan and construct more than 10,000 dams and 11,800 miles of floodways nationwide, and to adequately protect more than 75 percent of the land in the Nation's 1,500 approved small watershed projects.

States that have extensive watershed experience are much better prepared to carry out farm bill responsibilities. What we're learning in planning and operating land treatment projects has served as the model for conservation compliance work.

Increasingly, we look to PL 566 as an important tool for rural development. At a time of reduced municipal and Federal spending, the implications are clear. Over the years, PL 566 has depended on local participants for financial contributions, and they have responded. The local contribution to PL 566 has gone up—today it approaches 40 percent of the total.

Last spring, more than 300 national and State leaders gathered to evaluate the future impact of PL 566 programs on local watershed projects. Forty-four States were represented at the Second National Watershed Conference, which was held May 19-22 in Kansas City.

With the increasing attention paid to comprehensive resource planning that looks at entire watersheds, I believe that the Small Watershed Program is going to continue to make a significant contribution far into the future.


Chief

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Two Years Later

After Hugo, A Better South Carolina

AFTER ALMOST 2 years of work, Soil Conservation Service employees in South Carolina can begin to put the effects of Hurricane Hugo behind them. But they will long remember events in terms of "before" and "after" Hugo.

Most of South Carolina's 170 SCS employees were detailed to work in the 20 counties damaged by the storm. These employees, as well as those from 10 other States, worked 6 days a week from sunrise to sunset.

"At any one time, there were at least 100 SCS employees serving the citizens of South Carolina through the Hurricane Hugo cleanup," said Billy Abercrombie, State conservationist in South Carolina.

Emergency Watershed Protection (EWP) program work was begun October 1989 and finished in May 1991, at a cost of \$27.5 million. The work was accomplished through the use of individual contracts sponsored by local units of government. Contract sponsors included the State governor's office, 3 State agencies, 20 soil and water conservation districts, 20 county governments, and 62 cities and towns.



Watercourse in Isle of Palms, S.C., was blocked by debris following Hurricane Hugo in September 1989. After cleanout in January 1990, the sides of the watercourse were ready for revegetating. (David White and Debbie Cribb photos)

Sponsors set work priorities and assisted with debris disposal. And they helped enact local emergency ordinances so work could be performed on private property without individual permits. "We had excellent cooperation from the project sponsors," said Abercrombie.

More than 100 contracts were completed during 20 months of

fieldwork. Individual contracts ranged from a few thousand dollars to nearly \$1 million.

Workers used chainsaws and backhoes to remove fallen trees and other storm debris from watercourses in order to remove the threat of flooding to homes, businesses, and agricultural land and to return the area to its condition before Hugo.

After Hugo

EWP Program	Actions	Costs
• Watercourse cleaning	2,343 miles	\$23.1 million
• Dune stabilization	54 miles	\$1.1 million
• River restoration	349 miles	\$3.3 million

Protection provided: 61,191 homes, buildings; 6,252 roads, bridge crossings; and 172,836 agricultural acres

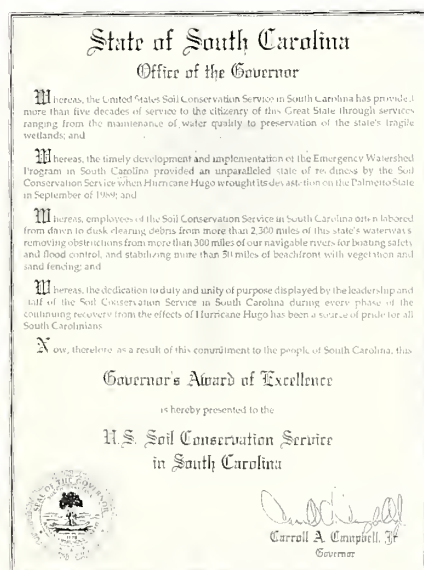
"We first concentrated on the urban area," said Wally Turner, EWP manager in South Carolina. "However, we also cleaned up damage in some rural areas, including rivers and coastal dune systems."

Shortly after Hugo, SCS began a joint project with the South Carolina Coastal Council to stabilize the rebuilt coastal dune system. During this 2-month project, SCS installed sand fences to collect windblown sand to help rebuild the primary dune system that had been flattened by Hugo.

"In most areas the new dune is as tall as the dune system before Hugo, which was about 4 feet," said Gene Hardee, SCS State conservation agronomist. "Sea oats, Atlantic coastal panicgrass, and American beachgrass were planted in the new dunes. Native vegetation is also coming in on many areas."



"Please Keep Off Dunes" signs, sand fences, and coastal grass plantings in North Myrtle Beach, S.C., work together in rebuilding and protecting the primary dune system that was damaged by Hurricane Hugo. (Debbie Cribb photo)



The South Carolina Governor's Award of Excellence was presented to SCS for outstanding assistance provided after Hugo. (SCS photo)

"During fence construction, we were concerned about vegetative plantings in the dunes and about loggerhead turtles that cross the dunes to nest," said EWP manager Turner. "Through a public awareness campaign, we asked vacationers to use designated walkways. As a result, the plantings survived the first summer and are growing successfully."

After Hugo, SCS began river restoration on the five hardest-hit navigable rivers. Downed trees made the damaged area virtually impassable. Boaters and sports enthusiasts were in danger from potential boat hazards, and emergency rescue operations were almost impossible.

In a joint effort with the South Carolina Water Resources Commission and South Carolina Wildlife and Marine Resources Department, SCS opened paths in the channels—each path was one-third the width of its channel, but no more than 30 feet wide. Debris was placed on the river banks and wedged or tied off.

"Using winches, underwater hydraulic chainsaws, and barges with mounted backhoes, crews cleared the channel paths," said Turner. "An eight-person crew averaged approximately a mile a week due to the environmental and physical de-

mands of the job. The project was completed in 8 months."

The Hurricane Hugo Emergency Watershed Protection Program in South Carolina has been recognized at many levels for its outstanding accomplishments. However, one of the highest hon-

ors was receiving the Governor's Award of Excellence at the Soil Conservation Service Annual Awards Ceremony in May 1991.

"It was an honor to accept the Governor's Award on behalf of SCS employees in South Carolina. They did an outstanding job in helping South Carolina recover from dam-

ages caused by Hurricane Hugo, the largest storm our State has experienced this century," Abercrombie added.

Debbie Cribb, public affairs specialist, SCS, Columbia, S.C.

How Long Is a Few Seconds?

IN 15 SECONDS you can make a long-distance phone call, tie your shoelaces, or sharpen a pencil. At 5:04 p.m. plus 15:24 seconds, Pacific Standard Time, on October 17, 1989, a disastrous jolt hit 10 counties in California's San Francisco Bay Area.

The switched-on Loma Prieta earthquake rumbled through the ground with a force of 7.1 on the Richter scale. Fifteen seconds later, the movement came to a jarring halt.

In that time, the quake claimed 63 lives, resulted in 3,757 injuries to residents, and caused over \$11 billion in structural and business losses. It damaged some 18,300 homes and 2,570 businesses. Large-scale highway losses included the Bay Bridge, which was



Heavy equipment scoops up material in the most debris-strewn part of Corralitos Creek, Calif.; landslides caused by the Loma Prieta earthquake deposited material that blocked the creek. (Richard Casale photo)

“...our main concern was telling owners about the effect winter rains would have on the exposed land.”



Eureka Canyon Road above Corralitos Creek, Calif., displays cracks and other earthquake damage. SCS designed the placement of loose, large rock riprap along the creek's bank to later anchor a rebuilt road. (Richard Casale photo)

closed for a month, and portions of some San Francisco freeways that remain closed today.

“Right after the quake, and the clearing of Corralitos Creek to prevent flooding, our main concern was telling owners about the effect winter rains would have on the exposed land,” noted Rich Casale, Soil Conservation Service district conservationist, Aptos, Calif.

SCS field office staffers provided onsite earthquake damage assistance to over 100 property owners. They advised landowners to look over all slopes and place plastic coverings over collapsing areas as

a very temporary emergency solution to soil erosion. The method was a way to buy additional time until deep-rooted plants could be grown. The coverings had to be periodically removed to let the hills dry out between rainstorms, or the overall result would be negative.

Casale emphasized that when landowners had to cover an earthquake-caused landslide area, they needed to cover more than the scarp, or top, of the landslide section. The toe, or bottom, of the slide area must also be protected, and water directed away from the

region. Otherwise, the earth mass would become saturated and have the tendency to slide further. If this occurred, the soil above might also begin to move downslope, causing a situation of worsening collapse.

Other options SCS'ers offered landowners were to cover slopes with seeded mulch and/or straw mulch. Either of these materials would hold the earth in place, let plants take root, and give the ground a chance to dry out.

“You can still see the scarps of the landslides today,” said Casale.



Two years after the earthquake, Corralitos Creek is free-flowing once again. After-quake rehabilitation work took place at three creek sites, all within a quarter-mile stretch. (Richard Casale photo)

"Although the bottom of a slide is revegetated, the scarp is often bare and exposed."

Steve Singer, SCS soil conservationist, Aptos, Calif., gave his view: "It's amazing how many of the problems we saw could have been avoided with proper plant care and maintenance. We have made lists of the erosion control plants developed for this area and provide those lists free of charge. Also, we recommend plants for permanent vegetation that require little or no irrigation."

SCS technicians inspected agricultural ponds, dams, channels, and reservoirs, as well as roads,

and recommended essential repair work. Other work required removal of landslide material that was blocking watercourses. The Santa Cruz County Resource Conservation District cosponsored and provided secretarial support for the SCS work that was funded through the Emergency Watershed Protection program.

Three landslides had blocked Corralitos Creek located in the remote Santa Cruz Mountains. Water had backed up 1,000 feet upstream on the creek, creating a pond 35 feet deep. SCS workers freed the creek of the sediment and debris.

Two years after the quake, unhealed scars are visible in the

cities and countryside of northern California. Particularly in the Santa Cruz mountains, the remnants of landslides are a grim reminder of the giant temblor.

"We were lucky that the first winter after the quake was fairly dry," added Casale, "because the weather allowed landowners an easier time rehabilitating the land. But the earthquake will affect the land for years to come. It's amazing how 15 seconds of earthquake can change things."

Rebecca de la Torre, public affairs specialist, SCS, Red Bluff, Calif.

After the fire, rainfall runoff from the burned area carried ash and sediment into White River...

Nebraska's White River Watershed Recovers

IN JULY 1989, lightning struck the Pine Ridge Forest in northwestern Nebraska. The forest was extremely dry and temperatures were over 100 degrees Fahrenheit. A forest fire resulted; in 5 days it burned nearly 50,000 acres of ponderosa pine and rangeland in the White River Watershed.

The nearby town of Crawford, Nebr., relies on the White River to supply water for its municipal use. After the fire, rainfall runoff from the burned area carried ash and

sediment into the White River, clogged the town's water filtration system, and cut off the town's water supply.

With the Upper Niobrara White Natural Resources District (NRD) as the local sponsor, the Soil Conservation Service initiated Emergency Watershed Protection (EWP) program assistance to protect the White River Watershed. The State of Nebraska also helped finance the efforts.

Some drainages in the watershed were supplying runoff from as many as 5,000 acres of the blackened area; therefore, the rapid design and construction of any sediment-control structures became a major challenge.

SCS decided that aerial grass seeding on 2,000 acres of the most severely burned areas and construction of five sediment-control basins in the major drainages of the White River Watershed would

be the most effective and timely solution. SCS personnel designed each of the sediment-control basins with an excavated sediment-holding capacity of about 2 acre-feet. The basins were designed with a 4-foot-high embankment, a 10-inch PVC outlet tube, and an emergency spillway.

Very little rainfall and snowmelt occurred after the grass-seeding, and basin-construction projects were completed in the fall of 1989.

In late April 1990, a brief thunderstorm caused significant runoff in the watershed. All runoff was contained in one of the drainages where rainfall occurred and the sediment-control basins had been constructed. This particular drainage contained two basins: the uppermost basin had been filled to capacity, and sediment was running through the PVC outlet tube and draining into the lower basin.

The White River did receive some ash and sediment from an area that was not protected by the basins, but the damage was not nearly as extensive as it would have been without the basins.

Authorities anticipate the grass seeding will be very effective, and residents and officials of the area have lauded SCS, the local NRD, and the State of Nebraska for their watershed protection efforts.

Craig R. Derickson, former district conservationist, SCS, Crawford, Nebr.; presently area resource conservationist, SCS, Lincoln, Nebr.



Runoff is now being caught in Nebraska's White River Watershed in the lower pool of a newly constructed sediment basin. (Ed Eitel photo)

Too Little Water

California Drought Takes Heavy Toll

DISASTROUS results of several years of California drought show in Soil Conservation Service national photographer Tim McCabe's pictures taken last February.

In April, the U.S. Department of Agriculture opened its California Drought Response Office. Darwyn Briggs, director of the office, summarized, "This is the fifth year of the drought, and 1991 was the driest of the five. Without the March rains, it would have been the driest year on record in California. And State, Federal, and local public agencies are planning on 1992 being as dry as this year."

The USDA Drought Response Office and the State of California will host a statewide planning conference related to the drought. Though Briggs observed, "I wish my job could be called on account of rain," he emphasized the need to help Californians through this drought and to develop plans for future droughts.

The Soil Conservation Service's California drought action plan calls for assisting farmers and ranchers with solutions to drought-caused problems and continuing to stress the need for making effective use of water every year, not only during drought periods.

Santa Margarita Lake in San Luis Obispo County is shown at 6 percent of its normal level. The usual shoreline is nearly 75 vertical feet above the current water surface. (Upper right)

SCS district conservationist Bill Gradle examines dry soil in the West Kern County Water Storage District. Dryland cropland here, normally planted with wheat or barley, will remain fallow for the 1990-91 growing season because of the lack of adequate soil moisture.





One of the remaining small herds of cattle in San Luis Obispo County grazes on depleted range. Barren hills in the background, typically lush with annual grass, are devoid of cover. (Above)



Salt-encrusted cropland tells the story in the Wheeler Ridge-Maricopa Water Storage District of Kern County.

One Year Later

Indiana Survives Tornado Blitz

“ON JUNE 2, 1990, we had 35 to 40 tornadoes in a 6-hour period in Indiana, with a reported 65 touchdowns,” said Robert L. Eddleman, Soil Conservation Service State conservationist in Indianapolis. “And most of them were in the southwest corner.”

“The towns of Petersburg and Bedford suffered direct hits from the same tornado. Several town buildings and a lot of homes were destroyed or heavily damaged.”

The Indiana Conservation Team responded immediately in communities across southern Indiana by organizing work parties and helping landowners. The team consisted of employees of SCS, the soil and water conservation districts, and the Indiana Department of Natural Resources (Division of Soil Conservation).

SCS field staffs immediately began damage evaluations. They told SCS program and technical specialists what they found. SCS acted quickly in getting approval of over a million dollars in Emergency Watershed Protection (EWP) funds.

The EWP program is authorized to assist in relieving imminent haz-

ards to life and property from floods and severe erosion.

Many rivers and creeks in southern Indiana appeared to become dumping grounds for damaged and uprooted trees. It didn't take farmers long to realize that the next few heavy rains could cause big problems where natural and artificial drainages were filled with debris.

The State's Emergency Management Administration also allocated money quickly to pay the local share of contract costs. Local sponsors used “generic work permits” to secure land rights for access. Using SCS-drawn specifications, they notified contractors, solicited bids, and awarded contracts.

The constant danger of bent limbs springing free and of downed trees shifting and rolling created hazardous working conditions for the contractors. Crews often worked from boats along steep riverbanks.

“Amazingly,” said Wayne Foust, SCS State construction engineer in Indianapolis, “as contractors cut their way into and through the masses of tangled trees and limbs, nobody was seriously injured.”

EWP work was done in 6 counties at 26 sites where repairs ranged from 100 feet to 5 miles in length. Over 17 miles of damage repairs have been completed. Whole trees and large treetops have been dragged from the streams and stacked outside the channels.

“Last year was one of incredible weather events in Indiana with record or near record weather conditions in 4 of the first 6 months,” said Eddleman. “But June was the most remarkable because of the number of tornadoes that hit the State.”

Mike McGovern, public affairs specialist, SCS, Indianapolis, Ind.



Workers attach cable to tornado debris in order to winch it from Smart Ditch in Jackson County, Ind. (Mike McGovern photo)

"I don't know how we could have rebuilt without RC&D's support...", said Limon Mayor Dennis Coonts.

RC&D Helps Town Recover From Tornado

MANY businesses, homes, and mobile homes were destroyed or severely damaged when a tornado twisted down the main street of Limon, Colo., on June 6, 1990. But, in just a little over a year, Limon citizens had rebuilt their small town and the East Central Colorado Resource Conservation and Development (RC&D) Area Council provided major assistance.

Within days after the tornado, town officials brought in a design team from the University of Colorado. Joe Kiely, director of the Limon Recovery Agency, said, "The



This is some of the tornado damage that the East Central Colorado RC&D Area Council is helping to repair. (Jerry Schwien photo)

team developed three illustrative plans for rebuilding Limon, and the town board selected a redevelopment plan within a couple of weeks."

A year later, major features of the redevelopment plan are almost

completed. A new town hall and a fire station were built. Streetscaping and facade improvements have been completed, and close to 500 trees have been planted in the new city park.

Renovations have begun on the senior center, and the regional education services building is being constructed. One million dollars is needed to construct a new medical center, and 75 percent has been funded.

The RC&D council decided that helping Limon was more important than anything else they were working on and told RC&D coordinator Sylvia Gillen she was to spend 80 percent of her time as grants coordinator for the Limon Town Board. To date she has helped obtain over \$500,000 in redevelopment grants for Limon.

"I don't know how we could have rebuilt without RC&D's support and Sylvia's help," said Limon Mayor Dennis Coonts.

The RC&D council purchased

Caught in a Tornado

Five members of a Soil Conservation Service appraisal team had no idea their dinner in Limon, Colo., would be interrupted by a tornado.

Bruce Lindahl, area conservationist and Mike Petersen, area soil scientist in Greeley, Colo., were looking out the window when they heard the news that a tornado was coming down Main Street. Others in the party—Carol Wettstein, State soil scientist, Jim Thornton, Watershed and River Basin staff leader, and Jerry Schwien, public affairs specialist, all from the State office, began to get nervous.

But the restaurant manager remained calm and said, "I think we should all get in the cooler." He led 12

people through the kitchen to a walk-in cooler. Lindahl said, "We were in there 20 seconds at the most when the tornado hit."

When Peterson looked out the cooler door, he saw the restaurant windows explode and the roof disappear. "It sounded like several trains going over."

Once the storm passed, everyone came out of the cooler. Rubble and debris were everywhere, and it was waist high. A local rancher said to the owner, "Joe, you no longer have a restaurant."

Once they got outside they smelled gas, saw downed power lines, and realized they were lucky to be alive.

two grantsmanship books to help Gillen research potential grantors for the city. "This turned out to be a very good investment, yielding over half a million dollars," said Gillen.

Gillen and LaRay Becker, RC&D secretary, located Colorado foundations that had emergency funds available. Soon thereafter, the RC&D council sponsored a tour of Limon for foundations that were interested in helping.

"They asked us to put written proposals together," said Gillen. "Since the foundations had been impressed by presentations from some of our senior citizens, we decided to involve them in writing proposals for grants, as well."

At first, the "seniors" did not believe they could write a grant proposal for their new Senior Center, but with a little help and guidance, they did, and a grant for \$75,000 was approved.

In total, the following nine major foundations and corporations approved grants: Coors Foundation, Gates Family Foundation, Boettcher, El Pomar, Colorado Trust, Texaco, U.S. West, Mr. Coffee, and American Express.

Jerry Schwien, public affairs specialist, SCS, Lakewood, Colo.

Watershed Program: Unique and Flexible

THE CRUSADE for soil conservation was linked first and foremost to the idea of maintaining the productivity of land for agriculture.

But, those concerned with soil erosion on individual farms have long known the need for dealing with cumulative effects of soil erosion on the wider area—the watershed.

Before scientists began to measure such things, observers speculated that the conditions that created soil erosion also resulted in more rapid runoff of rainfall to streams. The sediment in streambeds reduced capacity, leading to

more frequent floods. Sands deposited on small floodplains reduced their value as cropland or natural areas. Thus, the environmental condition of the whole watershed began to deteriorate.

Most of the watershed activities of the Soil Conservation Service are conducted under the authorities of the Watershed Protection and Flood Prevention Act of 1954, except for 11 projects authorized in the Flood Control Act of 1944.

But even before this, farmers worked on watershed projects requiring group action under the provisions of their State soil conservation district laws. For example, during the 1930's, farmers in the Jones Creek Watershed in western Iowa found that dealing with some of the larger gullies required group action. In addition to conservation practices on the farmland, they needed earthen dams with concrete spillways to control gullies. The enrollees at a Civilian Conservation Corps camp working under the direction of the

SCS built nine structures in the area to control large gullies.

After the passage of national legislation, the watershed work became a major activity in SCS, with a budget that was often more than one-third of SCS's total budget. The pressure from the countryside to pass the act was in large part an effort to develop flood control on the upstream watersheds.

Local groups sometimes promoted projects on these "small watersheds" as an alternative to larger, downstream structures that caused the inundation of farms and, in some places, whole towns. If the local people at times overestimated the cumulative value of many small structures for flood control downstream, the movement nonetheless included two important developments: The small projects involved a high degree of local interest and involvement in planning, operation, and maintenance; and, the projects linked the

Watershed Protection



This 1958 photo shows a Brown County, Kansas, farm protecting the watershed with terraces, contour farming, crop rotations, and an erosion control dam (bottom). (SCS photo)

notion of flood control to soil conservation work on the watershed lands.

Historically, watershed projects have had a wide variety of objectives such as flood control, land treatment, drainage, irrigation, municipal and industrial water supply, rural areas development, recreation, fish and wildlife enhancement, and water quality.

The breadth of the watershed project authorities leaves wide discretion for administrative decisions. Various administrations have seized on this and tried to shape the program to their ends. The Kennedy and Johnson admin-

istrations of the 1960's emphasized rural development and recreational objectives that would bring additional income to rural residents, and working with communities and suburban areas.

During the 1980's, SCS and the U.S. Department of Agriculture established reducing soil erosion as their priority. Following that determination, SCS emphasized "land treatment watersheds," which provided financial assistance for conservation practices on the farms in the watershed and deemphasized structures for flood control. Newly approved projects include a mixture of land treatment and structural types covering the range of purposes found in the 1954 act.

Trends in national priorities also affect watershed programs when public funds are used. For example, environmental groups promoting retention of habitat for wildlife have focused on the effects of flood control and drainage projects.

Projects have usually provided a procedure for shared costs, with the government share providing assistance beyond the financial and technical abilities of the landowners in the watershed. When costs and benefits are analyzed, social and environmental aspects must be taken into consideration. At times, the analysis has been restricted too much to monetary benefits.

If the small watershed program is to remain independent, it needs to protect and promote the unique aspects that distinguish it from other programs managed by SCS. The small watershed program has emphasized planning. During recent decades, additional specialists, such as economists, landscape architects, sociologists, and cultural resource specialists, have been added to the interdisciplinary teams.

There is strong local involvement and interest in watershed projects, which benefit a number of people. These elements should help ensure that watershed projects fulfill their promise.

Douglas Helms, national historian, SCS, Washington, D.C.

“...about 72 percent of the local project sponsors are doing an excellent job of operation and maintenance...”

Watershed Structures Require Maintenance

A CRITICAL TIME is approaching for watershed sponsors of dams constructed with the assistance of the Soil Conservation Service. Many dams, spillways, and other works installed under the authority of Public Laws 534 and 566 are 35 to 45 years old.

The structures are reaching the end of evaluated life for which flood protection and other benefits were initially claimed. Last year an SCS task force on remedial work surveyed the maintenance of hundreds of Agency-sponsored water resource projects.

The group found that “about 72 percent of the local project sponsors are doing an excellent job of operation and maintenance, and there are no real problems with those structures,” according to Thomas Wehri, assistant director, operations, SCS Watershed Projects Division, and task force chairman.

However, specific problems were found during the survey, such as the overgrowth of vegetation, seepage of water through earthen dams, deterioration of principal spillways, and erosion to outlet basin and emergency spillways. The task force evaluated

structures in Texas, Oklahoma, Kansas, Mississippi, and Nebraska.

In the spring of 1990, runoff above the 100-year flood event inundated parts of Texas and Oklahoma. “Dams in Oklahoma and Texas safely conducted the water, as planned, but the overflow area of the structures was often damaged,” noted Wehri. SCS worked with the Federal Emergency Management Agency to repair some 75 emergency spillways in Oklahoma.

“The State of Kansas and local sponsors there do an outstanding job keeping an inventory of watershed structures and performing their maintenance,” Wehri said.

The State Association of Kansas Watersheds honors the two sponsors who best operate and maintain watershed structures. “The

SCS work on the earthen Vineyard Road dam, Williams-Chandler Watershed, Ariz., repaired large cracks (see inset) by digging a trench through the dam and filling it with graded gravel. The gravel strained out soil, which could damage the structure, and allowed water to pass through the dam harmlessly. (Cecil Currin photo)



awards were first given this year and they'll be an incentive for watershed districts to do an even better job,” said John Reh, SCS assistant State conservationist. The Salt Creek Watershed in north-central Kansas won the award in the category of watershed districts of over 100,000 acres, while Doyle Creek Watershed District in south-central Kansas won for districts of less than 100,000 acres.

Wehri noted that besides flood control, the impoundment of water behind dams produces added benefits for recreation and the environment.

Mary Jo Stine, associate editor, *Soil & Water Conservation News*, SCS, Washington, D.C.

Coordinating Land Use, Dams, and Public Safety

“DAMS, BOTH Federal and non-Federal, are normally designed or evaluated with criteria

based on the existence or extent of downstream development,” said Joseph S. Haugh, Soil Conservation Service national water resources engineer, in the opening of his talk at the Second National Watershed Congress last May in Kansas City, Mo.

“Each dam owner...must be concerned with downstream land use. Conversely, local officials responsible for land use ought to be concerned about any dam which happens to be upstream.”

Haugh said that dam criteria are usually evaluated when the dam is built or inspected. Many dams built in rural areas met appropriate standards when built. But later on,

many of those same dams were determined to be unsafe because development had occurred downstream.

There are nearly 85,000 dams in this country; about 4,000 are Federal and the remainder are State installed or controlled. Of the remainder, 25,000 non-Federal dams were installed with SCS technical assistance (including about 10,000 receiving financial assistance through the small watershed and similar programs).

“Dams classifications are based on potential for loss in the event of failure,” said Haugh. Failure of a high-hazard dam could result in major damage and significant loss of life. Therefore, it is built to withstand the most extreme conditions. Haugh said a low-hazard dam is constructed to meet lower standards—criteria for which are calculated using “risk assessment.”

“Because downstream development can occur after a dam is built,” Haugh said, “there should be a better way to deal with the relationship between dam criteria and downstream land use than after-the-fact. It would be much more sensible to use some positive means to ensure that land use remains compatible with the dam’s criteria.”

“The State of Wisconsin has taken a positive approach to the

problem,” Haugh said. “If a dam is built for anything less than high-hazard criteria, the owner must certify that the area...remains in its current use through actual purchase, easements, or other controls.”

Alternative approaches, Haugh said, for any new dam might be to require that:

- The owner ensure that downstream land use remains compatible with the dam’s classification;
- The local group responsible for land use take action to prohibit incompatible development in the breach inundation area; or
- High-hazard criteria be used for all dam designs (this would require expensive dams and usually would not be practical in rural upstream areas).

“Dams already in existence should be addressed immediately—before downstream changes occur—so that we do not perpetuate the problem into the future,” added Haugh. “The key factor is to make people aware that land use in the area downstream of a dam affects public safety.”

Paul G. DuMont, associate editor, *Soil & Water Conservation News*, SCS, Washington, D.C.

"Instead of large areas of flooded bottomland, the small dams form permanent pools of only 3 to 5 acres each."

Missouri's 'Many Small Dams' Plan

BIG ISN'T always better. Just ask farmers, ranchers, and Soil Conservation Service field office technicians in northern Missouri about the many small dams being built there.

Landowners along the East Fork of the Big Creek Watershed in Harrison County balked at an original plan to construct three large floodwater-retarding dams that would each have a huge lake with limited conservation value and much reduced wildlife acreage. What the landowners wanted was a watershed made up of many small ponds.

The Harrison County Soil and Water Conservation District (SWCD) conducted group meetings to discuss landowners' needs and desires. Results of these meetings helped SCS more effectively design a small dams plan that included 111 very small dams and 90 small, grade-stabilization land-treatment structures. So far, 74 small dams have been built.

"This plan was touted as the 'people's choice' because this is what the people wanted," said Michael Wells, SCS assistant State conservationist for water resources, in Columbia, Mo. "Instead of large areas of flooded bottomland, the small dams form permanent pools of only 3 to 5 acres each.



Many small dams have been built on sites in the East and West Forks of Missouri's Big Creek Watershed for flood control. Resulting 3- to 5-acre ponds and lakes behind dams, as well as trees and brush cleared during construction, provide wildlife and fish habitat. (SCS photo)

"Small dams require less design effort because of their smaller hazard potential, and small, local contractors can build them. Only large-scale contractors with specialized equipment can construct larger dams. Each small dam costs only about \$40,000."

From an SCS standpoint, Wells pointed out that this approach is cost-effective because 6-inch, 8-inch, and 10-inch steel pipes replace the larger concrete pipes necessary for bigger dams. Pipes release water at a slow, controlled rate after the dams catch the water flowing from surrounding hills. Thus, flooding is controlled.

Howard Simpson, a farmer in Ridgeway, Mo., prefers small dams because they distribute stored water throughout the watershed.

"This is far better than the original plan," he said. "Aside from the

watershed's conservation benefits, a lot of people now have places to fish, and there's leftover brush piles for wildlife." Two ponds, totaling 10 acres, were built on Simpson's land.

Bob Price, Harrison County SWCD chairman, and Bob Harryman, SCS district conservationist, are pleased with "pioneer" efforts in the East Fork watershed.

"This is the first project in the Nation to use the 'many small dams' approach," added SCS'er Wells. "Plans have now been approved for the same approach in six other watersheds in the State. There are probably many places throughout the country where many small dams will be practical."

Charlie Rahm, public affairs specialist, SCS, Columbia, Mo.

It was decided not to use a structure at all, but to divert floodwater into a quarry downstream from the park.

Searching for A Home for Site No. 25

THERE WAS A TIME when most people thought the final structure of the Crabtree Watershed Project, near Raleigh, N.C., was never going to be built. No one questioned the need for the structure, but finding a suitable site was proving difficult.

Originally, site 25 was to be a dry structure. It would hold water only during times of flooding. Some of the water being held back would back up into Umstead State Park. Environmental groups were very concerned that this might

damage the park's delicate ecosystem.

Umstead is the only North Carolina State park within a metropolitan area. Raleigh is one of the Nation's fastest growing communities, and this rapid growth is threatening the park's natural environment.

In response to environmental concerns, the Soil Conservation Service's Water Resources Planning staff in North Carolina found another site. It was decided not to use a structure at all, but to divert floodwater into a quarry downstream from the park. Once the floodwater stage passed, stored water in the quarry could be pumped back into the stream at a safe rate.

Hydraulic modeling of the needed channel and weir spillway, performed by the U.S. Army Corps of Engineers, showed that site 25

was feasible and that the site size could even be reduced.

This alternative quickly proved to be a "win, win" situation for all involved. Project sponsors (Wake County, the City of Raleigh, and the Soil and Water Conservation Districts of Wake and Durham Counties) were pleased that the new proposal would be less expensive than the originally planned dry structure.

Eleven of the proposed 12 watershed structures have been completed. They are already reducing flooding in the metropolitan area and are also providing excellent recreational opportunities. Previously, flooding in Crabtree Creek caused considerable damage, including over \$1 million in damages from two floods in 1973.

Site 25 will be the largest of the 12 structures. It, along with the recently completed site 23, will provide the majority of the flood protection in the watershed.

The quarry is still operational. Removing additional rock will increase the quarry's capacity to hold floodwater. Construction on site 25 will not begin until the designed storage volume has been reached—within the next 5 years.

Andrew R. Smith, public affairs specialist, and **William H. Farmer, Jr.**, assistant State conservationist (water resources), SCS, Raleigh, N.C.



Floodwater from nearby Crabtree Creek, in the Raleigh metropolitan area, will be diverted into this quarry. (Wake County, N.C., government photo)

Resolving problems through trust and cooperation helps reduce litigation and taxpayer costs, increase contractor profits, and ensure project quality.

Handshakes Beat Stress In Corrales

PARTNERING, or cooperative contracting, is a concept that puts the handshake and trust back into the contracting process.

The concept works within existing policy, regulations, and contracts.

The Soil Conservation Service in New Mexico established a partnering commitment with Moore & Cowart Contractors, Inc., of Albuquerque, N. Mex., in October 1990 to complete construction of phase two of the Corrales Floodwater Diversion Project—a 5,500-foot rein-

forced concrete channel containing 7,300 cubic yards of concrete. The channel was scheduled to go into service in October and provide flood protection to the village of Corrales and to surrounding agricultural and developing areas.

For many—contractors as well as government employees—formal contracting has become an increasingly stressful and adversarial process. Government procedures and decisionmaking processes can be time-consuming and frustrating to the contractor.

Partnering, developed by DuPont Engineering, helps prevent disputes by developing a “win-win” relationship with trust and respect for both parties’ objectives. Partnering incorporates concepts of total quality management into the contracting process.

A contract defines the work to be completed and the price the contractor is willing to accept to complete the work. However, it does not describe the relationship between the parties.

The partnering agreement, developed by both parties, describes the relationship between them and establishes a common mission and objectives. The objectives are:

- A quality project;
- Completion on schedule;
- Completion without claims;
- Encouragement of valued engineering proposals;
- Timely processing of modifications; and
- Completion without injuries.

“The partnering process is working on the Corrales project,” said James Moore, president of Moore & Cowart Contractors, Inc. “Potential problems are headed off before they become problems. It’s a pleasure to go to the job.”

Successful partnering helps eliminate third-party disputes, court cases, and Board of Contract Appeals cases. Resolving problems through trust and cooperation helps reduce litigation and taxpayer costs, increase contractor profits, and ensure project quality.

“Partners, seeking common goals, produce successful projects,” added Ray Margo, Jr., SCS State conservationist in Albuquerque. “Success is always shared when produced through cooperative efforts.”

Stanley E. Cook, assistant State conservation engineer, SCS, Albuquerque, N. Mex.



David Pacheco, left, SCS project engineer, and Mike Moore, Moore and Cowart Contractors, Inc., project superintendent, discuss progress on the Corrales watershed project. (Jo E. Schilling photo)

NEWS Briefs

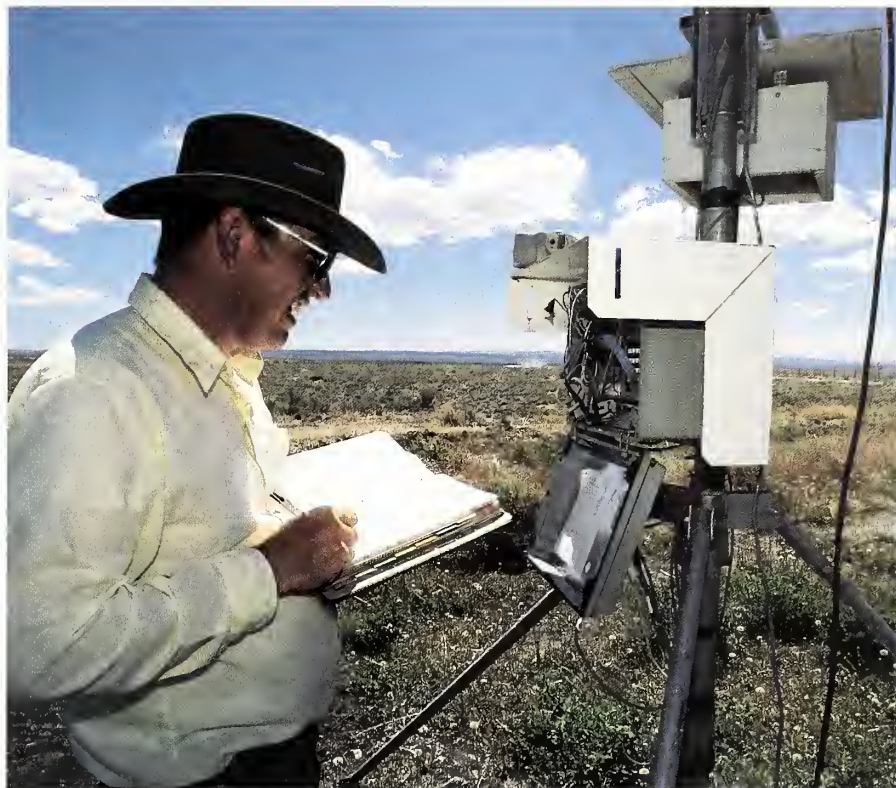
E.T., Phone Home

Do you remember the movie with E.T., the little extraterrestrial guy with the glowing finger? The Soil Conservation Service works with his counterpart in the plant world: evapotranspiration (also called E.T.) or the consumptive use of water through surface evaporation and plant transpiration. The amount of water needed to replace water lost through E.T. can be modeled using a computer and climatic data.

The SCS staff in Utah's Uintah Basin is involved with E.T. and with phoning home. The data collected helps farmers with irrigation water management. Now farmers will have better ideas of when to plan the next irrigations and how much water to apply.

As part of the Colorado River Salinity Program, the SCS staff in Roosevelt, Utah, has set up seven weather stations throughout the basin to gather climatic data hourly for the area. Station sites vary from 4,800 to 6,300 feet above sea level. All stations are connected to a phone line.

Each station robotically calls the field office computer every night and reports the day's findings. After all stations have reported, the computer figures the E.T. (that is, evapotranspiration)



Brent Draper is gathering data from one of the weather stations in Utah's Uintah Basin that has the capability to call in the day's findings. (Ron Nichols photo)

based on the data. The computer prints out the data daily and a summary weekly. This data is also sent by computer to the State climatologist's office at Utah State University.

The computer models alfalfa, small grains, pasture, and gardens. It can also model 12 other crops commonly grown in the Uintah Basin. The information produced is given to local newspapers and radio stations that have been helpful

in getting this information to the public.

With the diminishing supply of water in the Uintah Basin, having E.T. phone home is helping conserve this important resource.

Brent W. Draper, agricultural engineer, SCS, Roosevelt, Utah

Bay Plates Sell Like Hotcakes

Maryland's "Treasure the Chesapeake" license plates have been a big hit with motorists, who have snapped up over 169,000 sets.

Half the proceeds from sales of the plates are given to the Chesapeake Bay Trust. The cost of the plates is \$20.

"Treasure the Chesapeake" plates are available for passenger cars, multipurpose vehicles, and trucks up to three-quarters of a ton. Boat and camping trailers, taxis, and limousines also can be tagged. The program runs through 1992. For further information, call 301/950-1MVA.



The new Maryland "Treasure the Chesapeake" license plates are selling fast. (Kathleen Diehl photo)

Chinese Team Visits

Conservation leaders from the People's Republic of China came to Missouri last winter to learn more about soil and water conservation in the United States.

For a week, Mike Wells, assistant State conservationist for water resources; Martin "Buck" Burch, then area conservationist at Joseph; and other Soil Conservation Service (SCS) field personnel showed the visitors how the SCS watershed program operates in Missouri and which soil conservation practices are used.

"I don't know when I've worked harder during my SCS career, but I can't remember when I've had more fun, either," noted Wells. He

found that learning about language and cultural differences was a valuable experience.

Making up the Chinese team were Zhang Yue, Liu Chongyuan, Duan Qiaofu, Hu Weitai, and Hu Ping. The group members were picked to draft a soil and water conservation law for China. Tour members were eager to get copies of U.S. laws and learn about how they are implemented.

"The first purpose of our trip is to learn the law, and the second is to learn about the watershed process," observed Hu Ping.

Zhang is the director of the Rural Water Conservancy and Soil Conservation Department, Ministry of Water Resources. His position is comparable to that of the SCS Chief in the United States. Liu and Duan are engineers on that staff.

Hu Weitai is the division chief of the Water Conservancy Depart-

ment of Jilin Province. Hu Ping, a project official with the Foreign Affairs Department of the Ministry of Water Resources, served as interpreter.

In addition to visiting the SCS field office and farms in Andrew County, Mo., the group toured two watershed projects and the Kansas City suburb of Independence, where they looked at stormwater-runoff and sediment-control measures. Before Missouri, the Chinese team made its first stop at SCS headquarters in Washington, D.C.

SCS must have shown it had the "right stuff," Zhang commented that he was impressed with how much work SCS offices were able to accomplish with their staffs.

Charles Rahm, public affairs specialist, SCS, Columbia, Mo.

Watershed Achievement Awards Given

Soil Conservation Service employees from eight States and the Midwest and West National Technical Centers were named winners of SCS's Watershed Program Achievement Awards in 1990. Awards totaled \$28,000.

Winners were chosen based on exemplary achievement in meeting productivity and quality improvement goals. Areas of consideration were watershed planning, watershed protection operations, and emergency watershed protection.

Awards were based on the following criteria:

- In watershed planning, reduced planning time and cost had to be achieved by increasing the non-Federal share of project installation.

- In watershed protection, Federal costs had to be reduced.

- In emergency watershed protection, emergency work had to be completed within prescribed time limits and cost estimates.

State winners were from Georgia, Hawaii, Illinois, Iowa, Mississippi, Oklahoma, Oregon, and Vermont. Savings through these efforts totalled \$65 million in fiscal year 1990.

Farmers Know The Bottom Line Thanks to 'MAX'

The Conservation Technology Information Center is working with *Successful Farming* magazine, the Purdue University Agronomy Department, and an Iowa farm management firm to promote the MAX

(Maximum Efficiency for Profit) project.

Farmers participating in MAX learn costs and net returns of their corn and soybean crops while simulating use of no-till, ridge-till, chisel/disk-till, or conventional tillage systems.

Comparisons can be made of the different tillage systems when enough farmers in an area or State complete the project.

Soil and water conservation districts and others interested in obtaining MAX application cards and reprints of the April 1991 *Successful Farming* article on MAX should contact John Walter, senior editor, *Successful Farming*, 1716 Locust Street, Des Moines, Iowa 50336-0001.

Ag Waste Tips Are Available

The Alliance for a Clean Rural Environment (ACRE) recently started electronically transmitting practical tips on safe use of agricultural chemicals and water quality protection, as well as price quotes, commodity market news, and industry information.

ACRE supplies information to customers of AgriData Resources,

Inc. (ARI) of Milwaukee, Wis. Customers can receive the free ACRE environmental updates with a subscription to ARI's AgChem/Fertilizer Information Center Services.

"Electronic communication provides faster delivery of this and other important information, and is easier to update," said Greg Borchard, ARI's ag chemical industry manager. "Time-sensitive information is often more accurate."

ARI is a commercial supplier of electronic communications, business information, and news ser-

vices for the North American agricultural industry.

ACRE, a nonprofit educational organization sponsored by major manufacturers of agrichemicals, fosters agriculture's management of the environment through the safe use of agrichemicals and the protection of water quality.

News Briefs is compiled and edited by **Kim Berry Brown**, contributing editor, *Soil & Water Conservation News*.

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Conservation Calendar

November	6-9	Minority Participation in Forestry & Forest Related Sciences Symposium, Huntsville, Ala.
	10-13	12th Annual International Irrigation Exposition and Technical Conference, San Antonio, Tex.
	10-13	International Conference on Agriculture and the Environment, Columbus, Ohio
	14-16	64th National FFA Convention, Kansas City, Mo.
	22-25	National Council for the Social Studies Annual Meeting, Washington, D.C.
December	4-6	National Association of Government Communicators Annual Conference, Arlington, Va.
	5-7	National Science Teachers Association Fall Meeting, Reno, Nev.
	17-20	American Society of Agricultural Engineers International Winter Meeting, Chicago, Ill.
January	12-16	American Farm Bureau Federation's 73rd Annual Meeting, Kansas City, Mo.
	19-24	National Council of Farmer Cooperatives 63rd Annual Meeting, Orlando, Fla.
February	1-5	Southern Association of Agricultural Scientists 89th Annual Meeting, Lexington, Ky.
	2-6	National Association of Conservation Districts Annual Convention, Reno, Nev.
	18-21	International Erosion Control Association Conference, Reno, Nev.